CC01

國立臺北科技大學108學年度碩士班招生考試

系所組別：2210 電子工程系碩士班甲組

第一節　計算機概論　試題

注意事項：

1. 本試題共六大題，每題按比例配分，共100分。
2. 不必抄題，作答時請將試題題號及答案依照順序寫在答案卷上。
3. 全部答案均須在答案卷之答案欄內作答，否則不予計分。

一、[40%] Short answer questions (Briefly answer the following terminologies):

1. Cross compiler (5%)
2. Pipelining (5%)
3. Cache memory (5%)
4. Multiprogramming (5%)
5. Internet gateway (5%)
6. Reduced instruction set computer (5%)
7. Binary heap (5%)
8. Supervised learning (5%)

二、[15%] Represent a *half adder* with:

1. Truth table (5%)
2. Boolean expression (5%)
3. Draw a logic circuit using only NAND gates (5%)

三、[10%] Answer the following problems of Operating Systems:

1. What is a *Virtual Machine*? (5%)
2. What is the difference between *system virtual machine* and *process virtual machine*? (5%)

四、[15%] Answer the following problems of Computer Networks:

1. What is the difference between *MAC address* and *IP address*? (5%)
2. How to find out *MAC* and *IP addresses* in your personal computer? (5%)
3. What is the difference between a *static* and *dynamic* IP address? How can we check if have an internal *static* or *dynamic* IP on Windows? (5%)

五、[10%] Answer the following problems of Data Structures:

1. Given a sequence of number in array A, build a *binary search tree (BST)*, where A = <33, 72, 18, 3, 39, 81, 79, 42>. (5%)
2. What is worst-case, best-case, and average-case *time complexity* T(n) for search operation? (5%)

六、[10%] For the following equation: sum(n) = 1 + 2 + 3 + … + n,

1. Use divide-and-conquer method (data array A[n] is divided by 2) to solve the problem, and write the pseudocode for the recursive algorithm. (5%)
2. Write a recurrence for the time complexity T(n) of the recursive algorithm, then solve the recurrence and represent the time complexity using asymptotic notation. (5%)